

LISTING OF THE CLAIMS

This listing of the claims is provided for the Examiner's convenience, as no claim has been amended, added, or canceled in this response.

1. (Previously presented) A method of managing atrial antitachycardia pacing (ATP) therapy by an implantable device in response to possible atrial lead dislodgment, comprising:

measuring an impedance of an atrial lead for a particular patient;

comparing the measured impedance with an impedance threshold developed for the particular patient; and

in response to the measured impedance deviating from the impedance threshold by a predetermined factor indicating dislodgement of the atrial lead, disabling atrial ATP therapy for delivery until an enablement command is received from a patient external location.

2-3. (Canceled)

4. (Original) The method according to claim 1, wherein the impedance threshold is characterized by a mean or a median of a plurality of atrial lead impedance measurements.

5. (Canceled)

6. (Original) The method according to claim 1, wherein the impedance threshold is characterized by at least one atrial lead impedance measurement taken a predetermined amount of time prior to the impedance measurement.

7-12. (Canceled)

13. (Original) The method according to claim 1, wherein the predetermined factor is characterized by both a percentage change and a fixed delta change in the measured impedance relative to the impedance threshold.

14. (Original) The method according to claim 1, wherein measuring the impedance comprises delivering a pace pulse via the atrial lead and deriving the impedance measurement using the delivered pace pulse.

15. (Original) The method according to claim 1, wherein measuring the impedance comprises delivering a stimulus via the atrial lead and deriving the impedance measurement using the delivered stimulus, the stimulus having an energy insufficient to effect atrial capture.

16-17. (Canceled)

18. (Original) The method according to claim 1, wherein measuring the impedance comprises taking a plurality of impedance measurements after detection of an atrial arrhythmic event and prior to atrial ATP therapy delivery.

19. (Canceled)

20. (Previously presented) A method of managing atrial antitachycardia pacing (ATP) therapy by an implantable device in response to possible atrial lead dislodgment, comprising:

- measuring an impedance, a capture threshold, and a sense amplitude respectively associated with an atrial lead for a particular patient;

- monitoring for atrial arrhythmia;

- comparing the impedance, capture threshold, and sense amplitude measurements with impedance, capture threshold, and sense amplitude limits, respectively;

- disabling atrial ATP therapy for delivery in response to any of the impedance, capture threshold, and sense amplitude measurements deviating from the impedance, capture threshold, and sense amplitude limits by predetermined impedance, capture threshold, and sense amplitude factors, respectively when the atrial arrhythmia monitoring does not detect atrial arrhythmia during the measuring;

disabling atrial ATP therapy for delivery in response to only impedance measurements deviating from the impedance limit by the predetermined impedance factor and disregarding deviations from the capture threshold and the sense amplitude limit for the purpose of disabling atrial ATP therapy when the atrial arrhythmia monitoring detects atrial arrhythmia during the measuring;

receiving, patient internally, a command from a patient external location; and
enabling disabled ATP therapy for delivery based on the command.

21. (Original) The method according to claim 20, further comprising:

detecting an ambiguity in the impedance, capture threshold, and sense amplitude deviations; and

disabling atrial ATP therapy delivery in response to the detected ambiguity.

22-28. (Canceled)

29. (Original) The method according to claim 20, wherein one or more of the impedance, capture threshold, and sense amplitude limits are developed from one or more atrial lead measurements taken a predetermined amount of time prior to the respective impedance, capture threshold, and sense amplitude measurements.

30. (Original) The method according to claim 29, wherein the predetermined amount of time is within about one day.

31-32. (Canceled)

33. (Original) The method according to claim 20, wherein the predetermined impedance, capture threshold, and sense amplitude factors are characterized by both a percentage change and a fixed delta change in the impedance, capture threshold, and sense amplitude

measurements relative to the impedance, capture threshold, and sense amplitude limits, respectively.

34-35. (Canceled)

36. (Previously presented) An apparatus for managing atrial antitachycardia pacing (ATP) therapy in response to possible atrial lead dislodgment, comprising:

- an implantable housing;

- detection circuitry provided in the housing;

- energy delivery circuitry provided in the housing and configured to deliver an atrial ATP therapy;

- a lead system respectively coupled to the detection and energy delivery circuitry, the lead system comprising at least an atrial lead;

- a telemetry unit provided at least partially in the housing and configured to communicate patient externally;

- memory provided in the housing; and

- a control system provided in the housing and coupled to the memory within which an impedance threshold developed for a particular patient is stored, the control system configured to deliver an atrial ATP therapy using the energy delivery circuitry in response to detection of atrial arrhythmia, measure an impedance of the atrial lead, compare the measured impedance with the impedance threshold, disable the atrial ATP therapy for delivery in response to the measured impedance deviating from the impedance threshold by a predetermined factor indicating dislodgement of the atrial lead, communicate an indication associated with disablement of the atrial ATP therapy patient externally using the telemetry unit based on the measured impedance deviating from the impedance threshold, and enable the atrial ATP therapy for delivery after disablement based on a command received by the telemetry unit from a patient external location, wherein the atrial ATP therapy is not available for delivery when disabled until the atrial ATP therapy is enabled by the command.

37-38. (Canceled)

39. (Original) The apparatus according to claim 36, wherein the impedance threshold is characterized by a mean or a median of a plurality of atrial lead impedance measurements.

40. (Original) The apparatus according to claim 36, wherein the impedance threshold is characterized by an atrial lead impedance measurement taken immediately before a currently measured impedance.

41. (Original) The apparatus according to claim 36, wherein the impedance threshold is characterized by at least one atrial lead impedance measurement taken a predetermined amount of time prior to the measured impedance.

42-47. (Canceled)

48. (Original) The apparatus according to claim 36, wherein the predetermined factor is characterized by both a percentage change and a fixed delta change in the measured impedance relative to the impedance threshold.

49. (Previously presented) The apparatus according to claim 36, wherein the control system is configured to measure the impedance using a pace pulse generated by the energy delivery circuitry and delivered via the atrial lead.

50. (Previously presented) The apparatus according to claim 36, wherein the control system is configured to measure the impedance using a stimulus generated by the energy delivery circuitry and delivered via the atrial lead, the stimulus having an energy insufficient to effect atrial capture.

51-52. (Canceled)

53. (Previously presented) The apparatus according to claim 36, wherein the control system is configured to measure the impedance by taking a plurality of impedance measurements after detection of an atrial arrhythmic event by the detection circuitry and prior to atrial ATP therapy delivery.

54. (Canceled)

55. (Previously presented) The apparatus according to claim 36, wherein the control system is further configured to:

- measure a capture threshold and a sense amplitude respectively associated with the atrial lead;

- compare the capture threshold and sense amplitude measurements with capture threshold and sense amplitude limits, respectively; and

- disable the atrial ATP therapy for delivery in response to one or more of the impedance measurement deviating from the impedance threshold by a predetermined impedance factor indicating dislodgement of the atrial lead or the capture threshold and sense amplitude measurements deviating from the capture threshold and sense amplitude limits by predetermined capture threshold and sense amplitude factors, respectively.

56-57. (Canceled)

58. (Previously presented) The apparatus according to claim 55, wherein the control system is further configured to:

- detect an ambiguity in the impedance, capture threshold, and sense amplitude deviations; and

- in response to the detected ambiguity, disable the atrial ATP therapy for delivery in response to the measured impedance deviating from the impedance threshold by the predetermined factor indicating dislodgement of the atrial lead.

59. (Canceled)

60. (Previously presented) The apparatus according to claim 55, wherein the control system, upon detection of an atrial arrhythmia, is configured to ignore the capture threshold and sense amplitude deviations and disable the atrial ATP therapy for delivery in response to only the measured impedance deviating from the impedance threshold by the predetermined factor indicating dislodgement of the atrial lead.

61-62. (Canceled)

63. (Previously presented) The method of claim 1, further comprising delivering a non-atrial tracking pacing therapy for addressing atrial arrhythmia when the atrial ATP therapy is disabled.

64. (Previously presented) The apparatus of claim 36, wherein the control system is further configured to deliver a non-atrial tracking pacing therapy using the energy delivery circuitry in response to detection of atrial arrhythmia when the atrial ATP therapy is disabled for delivery.